Ch 9 Energy and the cell FALLIN Notes

1. All living things require energy
2. Energy is stored in chemical bonds
3. Chemical bonds form the food we eat
4. Glucose (C 6H12 O6 ) is the body’s primary f uel

Problem- (C 6H12 O6 ) is too large for the direct use in cell.

Solution- it has to be converted to another form

Analogy: dollar bill- glucose to 4 quarters

Both forms are equivalent in energy.

(C 6H12 O6 ) is converted to ATP

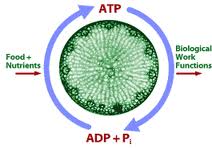
Conversion occurs in mitochondria

**ATP is a rechargeable battery**

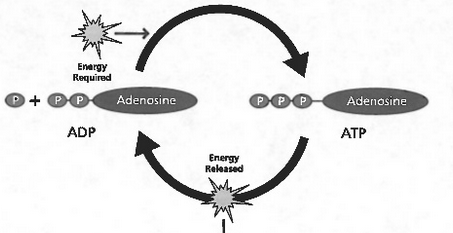
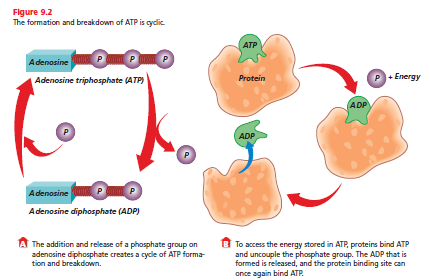
( ATP)APPP produces energy for the cell by breaking the bonds to produce ADP + P

ATP 🡪 ADP + P + energy

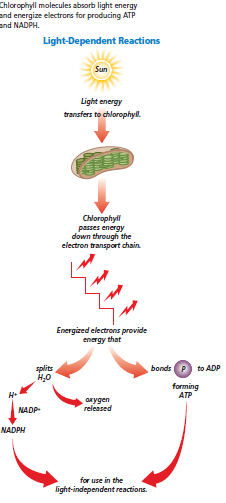
ADP + P + energy from glucose 🡪 ATP (high energy molecule with recreated bonds)



* Energy is located in bands
* Mitochondria is the powerhouse of the cell
* Glucose is changed to energy here
* Glucose charges ADP + P 🡪 ATP



**Photosynthesis- chloroplast only (plants)**

**2 stagaes**

Light Rxn + Dark Rxn; occurs in chloroplast

**Light Rxn**

* requires light and occurs in the thylakoid membrane in the chloroplast
* \*\*Sunlight changes ADP + P 🡪 ATP
* O2 is the waste produced
* Water is used with sunlight to charge ADP + P 🡪 ATP
* Photolysis- light breaks water🡪 H+ + e- + O2

**Dark Rxn**

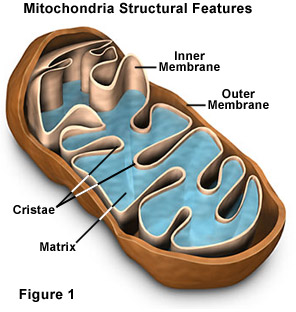
* Does not require light
* Calvin cycle- occurs in stroma
* \*\*ATP from light Rxn used to make glucose (C6H12O6)
* CO2 + ATP 🡪 C6H12O6 + ADP + P

The ADP + P produced charges to produce ATP for Light reaction

\*\*Glucose is made here

Light + CO2 + H2O 🡪 C6H12O6 + O2

**Respiration**

C 6H12 O6  + 6O2 🡪 6CO2 +6 H2O + ATP

2 phases: AnO2  + AO2 or Anaerobic (w/o O2)  + Aerobic (W/O2)

Purpose: burn glucose 🡪 ATP

Location: Mitochondria (powerhouse of cell) Breaking glucose

Start: Glycolysis- AN02: occurs in cytoplasm of cell 🡪 2 ATP + broken glucose

Middle: Citric Acid Cyce (AO2)🡪 ATP (2) + e- (lotsa) Matrix of mitochondria

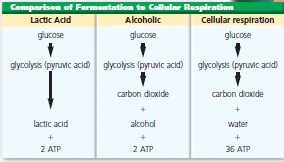
End: Electron Transport Chain 🡪 32 ATP (\*O2 carries e- away); in membrane of mitochondria

ADP + P 🡪 ATP occurs inside matrix

R

C 6H12 O6  + 6O2 🡪 6CO2 +6 H2O + ATP

🡨 P



Why I water plants, photosynthetically speaking

Light Supply Glucose

Broken apart elecrons

Water ATP

Photolysis Dark Reaction

Water is necessary to be broken apart by light during photolysis to supply electrons for the formation of ATP which is supplied to the Dark Reaction so that glucose can be made.

